

APPARATUS AND METHOD FOR MEASURING AND OF CONTROLLING  
THE GAP BETWEEN POLYMER SHEET COOLING ROLLS

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25/02/01*  
This application is a continuation in part of serial no. 09/422,483, filed October 21, 1999, now U.S. Pat. 6,406,285. Field of the Invention

[0001] This invention relates to apparatus and method for accurately and uniformly cooling a preformed polymeric sheet. It further relates to apparatus and method for extruding and cooling a preformed polymeric sheet wherein the gap between adjacent rolls is measured and controlled for accurately and gently cooling the polymeric sheet with minimum stress. ~~This application is a continuation in part of application Serial No. 09/422,483, filed October 21, 1999.~~

Description of the Related Art

[0002] Polymeric extruded or coextruded sheets are usually extruded out of a slit die of appropriate width, as indicated in the U.S. Patents to Frank R. Nissel Nos. 3,918,865, 3,940,221, 3,959,431, 4,533,510 and 5,466,403, for example. The hot sheet is then cooled by passing it through a pair or a series of temperature-controlled rolls. Although various roll numbers and arrangements may be used, three rolls are often used, sometimes in planar alignment with each other. The gaps between the rolls are desired to be precisely adjusted according to the desired final sheet thickness. This precision is necessary for a variety of reasons, including elimination of air entrapment between the rolls, which causes adverse or uneven heat transfer or cooling. The rolls typically apply embossing to provide a high quality surface impression on the sheet. If the roll opening is too small, material being processed will accumulate and form a bank, which will cause surface defects and stresses in the sheet if it becomes excessive or cooling and surface defects.

[0003] Traditionally, the sheet die exit is horizontal and the sheet runs through a cooling roll stack at any angle, either upwardly or downwardly. Vertical, horizontal or various angled roll stacks may be used.

[0004] For various purposes, the art has made efforts from time to time to measure the gap